Milk is a complex mixture of water, lactose, fat, protein, minerals and vitamins distributed throughout colloidal and soluble phases. Liquid milk is an essential nutritional food for infants, adults as well as the aged. The increased requirement of milk has resulted in the fraudulent practice of adulterating the milk as well as preparing synthetic milk, with some of the common practices being addition of water along with starch of skimmed milk powder, removal of fat etc.

Upon mixing synthetic milk, natural milk may contain hazardous chemicals like urea, laundry detergents, pulverized soap, boric acid, hydrogen peroxide, starch and neutralizers (caustic soda or sodium hydroxide, sodium carbonate and sodium bicarbonate). Prolonged accumulation of urea and detergents in the human body metabolism leads to various health hazards from gastro-entero disorders, acute kidney failure to even cancer and other serious disease conditions.
Development of Strip-based Kit

Looking into these concerns, worries and possibilities, Pearl Corporation along with DFRL has come up with an innovative idea of developing ready-to-use, convenient, cost effective and easy to-handle test strips to detect chemical adulterants and to establish the freshness of milk as per user requirements.

Usage of test strips is very handy and never raises the problem of spillage of chemicals or reagents on the users. It has the ease of application from house-hold to field level use of services. The kit includes strips to detect added starch, urea, pulverized soap, detergents, hydrogen peroxide, boric acid and neutralizers. Test results are easily distinguishable by observing the colour change in the samples. Most of the test-strips can detect an adulteration level as less as 0.5% and are stable up to one year at room temperature conditions. The test strips are made of chemicals mainly used in the qualitative determination of cations and anions. The principle and working of the detection strips are simple colour forming reactions resulting in pH variations and the formation resulting in the tests are easily distinguishable within 5 minutes by the user and the results are accurate and highly dependable.
**Microbial Quality (MQ) or Freshness of Milk**

Milk is very susceptible for microbial contamination since it undergoes a lot of handling from milking till it reaches the end user. So, establishing the quality of milk in terms of microbial quality is also very much important. To detect the microbial quality or freshness of milk, the kit provides two test strips i.e. MQ-1 and MQ-2. These strips reduce their natural colour within 30 minutes based on oxidation–reduction potential of milk caused by the load of bacteria present with respect to time.

**Conventional Test for Specific Gravity**

**TEST-O-MILK** kit also provides the conventional lactometer and a sample container to check the specific gravity of milk using the usual procedure. Addition of water decreases the natural density of milk and can be interpreted easily on the spot. Specific gravity is also affected by addition of skimmed milk (increase in specific gravity) or removal of fat (increase in specific gravity).
“A glass of pure milk alone can make a contribution to the daily recommended intake of many important nutrients for all age groups.”
Follow the 3 simple steps to determine the purity of your milk.

1. Using the milk dropper, fill up the screw cap bottle completely with milk.

2. Using the forceps, dip the required test strip into their respective bottles & shake well.

3. Observe the colour change of strip / milk after 5 minutes.
Check your results by observing the change in the colour of the strip/milk or both. Given below are the test observations.

1 Test for Boric Acid

Observe Change in Colour of: Strip

- **Natural Milk**: No Change
- **Adulterated Milk**: Deep Orange

(Minimum detection range: 0.5%)
2 Test for Urea

Observe Change in Colour of: Strip

Natural Milk
Adulterated Milk

No Change
Yellow

(Minimum detection range: 0.5%)
3 Test for Starch

Observe Change in Colour of: Milk

**Natural Milk**

**Adulterated Milk**

- No Change
- Blue Sediments

(Minimum detection range: 0.5%)
4 Test for Detergent / Pulverised Soap

Observe Change in Colour of: Strip / Milk

Natural Milk

Adulterated Milk

Light Yellow

Blue

Yellow

Green

(Minimum detection range: 0.5-1%)
5 Test for Hydrogen Peroxide

Observe Change in Colour of: Strip / Milk

- **Natural Milk**: No Change
- **Adulterated Milk**: Dusty Yellow

(Minimum detection range: 1%)
6 Test for Neutralizer

Observe Change in Colour of: Strip / Milk

Natural Milk

Adulterated Milk

Light Orange

Light Pink

(Minimum detection range: 0.5%)
To determine the microbial quality of milk, fill up the screw cap bottle completely with milk. Insert the strip, shake well and observe the change in colour of milk / strip after 25-30 minutes.

**Test for MQ-1**

**Observe Change in Colour of: Strip / Milk**

- **Purple to Pink**
  - **Milk Quality: Poor**
    - If the colour of milk or strip changes before 25 minutes then the quality of milk is poor.
  - **Milk Quality: Good**
    - If the colour of milk or strip changes after 25 minutes then the quality of milk is good.
8 Test for MQ-2

Observe Change in Colour of: Strip / Milk

Blue to Colourless

Milk Quality: Poor
If the colour of milk or strip changes before 25 minutes then the quality of milk is poor.

Milk Quality: Good
If the colour of milk or strip changes after 25 minutes then the quality of milk is good.
How to check the purity of milk using Lactometer (Specific gravity test)

Fill the plastic cylinder with milk (approx. temperature of 15.6°C). Dip the Lactometer and observe the reading.

Correlate the readings with reference values given below.

Reference Value Range:

For Testing Cow Milk:
1.028 - 1.030

For Testing Buffalo Milk:
1.030 - 1.032
Observation & Interpretation:

Decrease in Lactometer reading indicates **addition of water or increase in milk temperature.**

Increase in Lactometer reading indicates **removal of fat or addition of skimmed milk or reduction in milk temperature.**
Cautions

- Keep the strip away from heat / sunlight
- Keep out of reach of children
- Do not consume the test sample of milk
- Wash your hands after testing
- Always use forceps to handle the strips
- Do not reuse the strip
Pearl Corporation is a business group which has acquired technology rights from DFRL to manufacture India’s First Strip-based Milk Testing Kit. The team is backed by rich experienced individuals from the field of manufacturing, packaging & providing innovative solutions.

The company’s commitment towards innovating the easy-to-use testing of milk has resulted in the foundation of TEST-O-MILK.

To get pure milk is our National & Constitutional Right – We assure you can have it!
“When milk is pure happiness is sure.”